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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/559,960

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Michael C. Gaidis

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EXAMINER

GOODWIN, DAVID J

ART UNIT

PAPER NUMBER

2818

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/559,960

Applicant(s)

GALDIS, MICHAEL C.

Examiner

David Goodwin

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 June 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date: _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 2, 3, 6, 7, 8, 9, 10, 11 and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Tsang (US 6,909,630).

3. Regarding claim 1 and 8.

4. Tsang teaches a semiconductor device. Said device comprises a conductive line structure for a field effect transistor based magnetic random access memory device. A lateral magnetic strap (79) having an elongated rectangular shape conductively coupled to a lower metallization line (78) (column 10 lines 10-40). A magnetic tunnel junction (3101, 3102, 3103) formed on the metal strap (79). A layer (3104) comprising a first metal layer and an second overlying metal layer is formed over the MTJ stack, said metal layers being self aligned with respect to the metal strap (79) and having an elongated rectangular shape (column 9 lines 20-50). An upper metallization line (32) conductively coupled to said metal layers (3104) (fig 7) (column 10 lines 15-50).

5. The limitations must distinguish from the prior art in terms of structure rather than function, *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir.

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1997); See also *In re Swinehart*, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971). Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danly*, 263 F. 2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does." *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F. 2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990).

6. A claim to the structure of a device must distinguish from the prior art based upon differences in the structure rather than in differences in how the structure is made (MPEP 2113).

7. The claim is directed to the product per se, no matter how actually made. See *In re Thorpe et al.*, 227 USPQ 964 (CAFC, 1985) and related case law cited therein which make it clear that it is the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that, as here, an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. As stated in *Thorpe*,

a. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. *In re Brown*, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972); *In re Pilkington*. 411 F2d 1345, 1348, 162 USPQ 145, 147, (CCPA 1969); *Buono v. Yankee Maid Dress Corp.*, 77 F.2d 274, 279, 26 USPQ 57, 61 (2d. Cir.1935).

Note that Applicant bears the burden of proof in such cases as the above case law makes clear.

8.

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9. Regarding claim 2 and 10.

10. Tsang teaches a nonmagnetic layer (3102) is formed between a lower magnetic layer (3101) and an upper magnetic layer (3103) (column 6 lines 10-40). A layer (3104) comprising a first metal layer and an second overlying metal layer is formed over the MTJ stack, said metal layer being self aligned with respect to the metal strap (79) (column 9 lines 20-50). The distance between the upper metallization line (32) and the upper magnetic layer (3103) is defined by a total thickness of the first metal layer and the second metal layer (3104) (fig 7).

11. The limitations must distinguish from the prior art in terms of structure rather than function, *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997); See also *In re Swinehart*, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971). Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danly*, 263 F. 2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does." *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F. 2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990). The overlying metal layer could be used as an etch stop layer.

12. Regarding claim 3.

13. Tsang teaches the thickness of the first metal layer and the second metal layer (3104) is about 400 angstroms (column 9 lines 25-50).

14.

15. Regarding claim 6.

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16. Tsang teaches the lower metallization line (78) is formed at a first metallization level of the MRAM device. The second metallization line (32) is formed at a second level of the MRAM device (fig 7).

17. Regarding claim 7.

18. Tsang teaches a wordline (30) formed at a lower metallization level and adjacent said lower metallization line (78). Said wordline (30) electrically insulated from said lateral metal strap (79) and said wordline (30) disposed below said MTJ stack (31). The upper metallization (32) comprises a bit line of an individual MRAM cell, said cell including said MTJ and said wordline (fig 7) (column 10 lines 10-40).

19.

20. Regarding claim 9.

21. Tsang teaches the thickness of the first metal layer and the second metal layer (3104) is about 200 angstroms (column 9 lines 25-50).

22. A claim to the structure of a device must distinguish from the prior art based upon differences in the structure rather than in differences in how the structure is made (MPEP 2113).

23. Regarding claim 11.

24. Tsang teaches the thickness of the first metal layer and the second metal layer (3104) is about 400 angstroms (column 9 lines 25-50).

25. Regarding claim 9.

26. Tsang teaches the thickness of the first metal layer and the second metal layer (3104) is about 200 angstroms (column 9 lines 25-50).

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27. A claim to the structure of a device must distinguish from the prior art based upon differences in the structure rather than in differences in how the structure is made (MPEP 2113).

28. Regarding claim 12.

29. Tsang teaches the thickness of the first metal layer and the second metal layer (3104) is about 200 angstroms (column 9 lines 25-50).

30. A claim to the structure of a device must distinguish from the prior art based upon differences in the structure rather than in differences in how the structure is made (MPEP 2113).

31.

Claim Rejections - 35 USC § 103

32. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

33. Claims 4, 5, 13, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsang (US 6,909,630) as applied to claim 1 and 8 above, and further in view of Kim (US 6,806,096).

34. Regarding claims 4 and 13.

35. Tsang teaches elements of the claimed invention above.

36. Tsang does not teach the use of tantalum in the metal layers.

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37. Kim teaches a semiconductor MRAM device. Said device comprises a metal capping layer (126) comprising a combination tantalum and tantalum nitride (column 6 lines 1-5).

38. It would have been obvious to one of ordinary skill in the art to make the second metal layer of tantalum nitride in order to increase conductivity and reduce diffusion.

39. Regarding claim 5.

40. Kim teaches a semiconductor MRAM device. Said device comprises a metal capping layer (126) comprising a combination tantalum and tantalum nitride (column 6 lines 1-5).

41. It would have been obvious to one of ordinary skill in the art to make the first metal layer of tantalum nitride in order to increase conductivity and reduce diffusion.

42. A claim to the structure of a device must distinguish from the prior art based upon differences in the structure rather than in differences in how the structure is made (MPEP 2113).

43. Regarding claim 14.

44. Kim further teaches encapsulating the metal device with an encapsulating dielectric (135, 144) (fig 16) (column 7 lines 1-45).

45. It would have been obvious to one of ordinary skill in the art to encapsulate the device in a dielectric in order to protect the device from contamination and damage.

46. Regarding claim 15.

47. Kim further teaches that a lower metallization (114) is connected to a lateral strap (12) by a via (116) (fig 16) (column 5 lines 25-40).

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48. It would have been obvious to one of ordinary skill in the to connect a lower metallization to the strap by means of a via in order to increase the control of where metallization lines run.

Response to Arguments

49. The applicant argues that the prior art does not teach the patterning the capping layer to be self aligned with the conductive strap.

50. The applicant will note that the claim is directed towards the product and not the process. The capping claim is aligned with the conductive strap (fig 7).

51. The claim is directed to the product per se, no matter how actually made. See *In re Thorpe et al.*, 227 USPQ 964 (CAFC, 1985) and related case law cited therein which make it clear that it is the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that, as here, an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. As stated in *Thorpe*,

b. Even though product-by-process claims are limited by and defined by the process, determination of patenability is based on the product itself. *In re Brown*, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972); *In re Pilkington*. 411 F2d 1345, 1348, 162 USPQ 145, 147, (CCPA 1969); *Buono v. Yankee Maid Dress Corp.*, 77 F.2d 274, 279, 26 USPQ 57, 61 (2d. Cir 1935).

Note that Applicant bears the burden of proof in such cases as the above case law makes clear.

52. The applicant argues that the prior art does not teach that the capping layer is the same shape as the conductive strap.

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53. As the applicant will note in fig 7, the capping layer is an elongated rectangle and the conductive strap is an elongated rectangle and therefore the same shape.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Goodwin whose telephone number is (571)272-8451. The examiner can normally be reached on Monday through Friday, 9:00am through 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Loke can be reached on (571)272-1657. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DJG

STEVEN LOKE
SUPERVISORY PATENT EXAMINER

A handwritten signature in black ink, appearing to read "Steve Loke", is written below the printed name and title.